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**INK JET RECORDING DEVICE**

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**CLAIMS**

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**[Claim(s)]**

[Claim 1] An ink jet type recording device which is an ink jet type recording device equipped with a capping means to attract ink from a recording head in response to negative pressure from a suction pump while closing an ink jet type recording head which carries out the regurgitation of the ink drop corresponding to print data, and said recording head, and is characterized by providing a control unit to which suction speed of ink is changed in a step which attracts ink from a recording head with said capping means.

[Claim 2] Said control unit is an ink jet type recording device according to claim 1 characterized by being constituted so that a change property of changing suction speed of ink gradually may be generated.

[Claim 3] Said control unit is an ink jet type recording device according to claim 1 characterized by being constituted so that a change property of changing suction speed of ink continuously may be generated.

[Claim 4] Said control unit is an ink jet type recording device according to claim 1 characterized by being constituted so that a change property of changing suction speed of ink gradually and continuously may be generated.

[Claim 5] Said control unit is an ink jet type recording device according to claim 1 characterized by being constituted so that a change property of decelerating suction speed of ink gradually as a sequence which carries out another \*\*\*\* activation of the step which attracts ink at multiple times is generated and it moves from an early ink suction step to an ink suction step of an anaphase from a recording head with a capping means may be generated .

[Claim 6] Said control unit is an ink jet type recording device according to claim 1 to 5 characterized by constituting so that dividing of the signal acquired from a reference signal oscillator may be carried out based on different dividing data and a drive motor of said suction pump may be driven based on a signal by which dividing was carried out.

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention has the recording head which moves crosswise [ of a record form ], faces it attracting ink from a recording head in details more, and performing cleaning about the ink jet type recording device which breathes out an ink drop in a record form based on print data, and prints an image, and relates to the ink jet type recording device which enabled it to shorten the time amount which cleaning takes by controlling the suction speed of ink proper.

[0002]

[Description of the Prior Art] Since graphic operation can perform comparatively easily by development of a personal computer, the recording device which is displayed on a display and which can output the hard copy of a color picture for high quality, for example is called for.

[0003] In order to meet such a demand, the recording device which carried the ink jet recording head is offered. This ink jet type recording device has the small noise at the time of printing, and since it can form a dot small moreover by high density, it is used for many printings centering on color printing.

[0004] Record is performed by making a record form breathe out an ink drop and forming a dot, such an ink jet type recording device being equipped with the ink jet type recording head which receives supply of the ink from an ink cartridge, and the paper feed means to which a record form is relatively moved to a recording head, and moving a recording head according to a printing signal.

[0005] Thus, restoration of the ink to a recording head, processing which carries out suction discharge of the ink compulsorily from a recording head in order to prevent the blinding by the vaporization of an ink solvent again, and actuation of supplying the driving signal which is unrelated to printing data again, and making an ink drop breathing out from the nozzle orifice of an arm head in a non-printing area are performed on the relation treating a liquid called ink.

[0006] Compulsory discharge processing of the ink of a blinding dissolution of a recording head performed for accumulating Usually, the case where it is called cleaning actuation and printing is resumed after the pause of the long duration of a recording device, Moreover, in order that a user may cancel a poor quality of printed character, such as a printing blur, when a cleaning switch is pressed It is processing accompanied by wye pink actuation by the wiping member which close a recording head with a capping means, and negative

pressure is made to act, is made to discharge ink, and consists of elastic plates, such as rubber, after that.

[0007] Actuation of impressing a driving signal to a recording head and on the other hand making ink breathing out is actuation performed for every fixed period in order to usually be called the Flushing actuation, and to recover the irregular meniscus near the nozzle orifice of an arm head at the time of cleaning actuation and for the regurgitation of an ink drop to prevent the blinding of few nozzle orifices during printing by wiping etc. at it.

[0008] Drawing 7 shows the conventional general operating sequence at the time of performing cleaning actuation. That is, if the command of cleaning treatment is received, in step S101, wiping actuation will be performed by passing the upper part of the wiping member which was made to move a recording head to a non-printing area side, and has been arranged at the portion concerned. In the processing which makes ink attract compulsorily from a recording head with the capping equipment following a degree, wiping actuation in this step S101 is performed in order to raise the adhesion of the recording head to capping equipment.

[0009] Then, in step S102, a recording head moves onto capping equipment, the closure is carried out and comparatively a lot of ink is attracted by capping equipment from a recording head (this suction).

[0010] And in step S103, the atmospheric-air disconnection bulb arranged at some capping equipments is opened, and when the suction pump which is open for free passage to capping equipment operates, the ink attracted in capping equipment is discharged by the waste ink tank.

[0011] Then, in step S104, as for a recording head, little suction actuation of ink is again performed by capping equipment (minute amount suction 1).

[0012] this should foam the air bubbles containing the nozzle of an arm head in little suction actuation -- it carries out so that there may be nothing. And in step S105, the atmospheric-air disconnection bulb opened for free passage by capping equipment is opened, and when the suction pump which is similarly open for free passage to capping equipment operates, the ink attracted in capping equipment is discharged by the waste ink tank.

[0013] Furthermore, in step S106, a recording head performs wiping actuation which passes through a wiping member top, and the ink bubble which adhered on the surface of the recording head by this is removed by this wiping.

[0014] Then, in step S107, as for a recording head, little suction actuation of ink is again performed by capping equipment (minute amount suction 2).

[0015] This is cleaning actuation of finishing and recovers the irregular meniscus in a recording head.

[0016] And similarly, when the atmospheric-air disconnection bulb arranged in step S108 at capping equipment is opened and the suction pump which is open for free passage to

capping equipment operates, the ink attracted in capping equipment is discharged by the waste ink tank.

[0017] Then, in step S109, a recording head performs wiping actuation of finishing which passes through a wiping member top, and shifts to the weight (standby) actuation in S110. This weight actuation waits for natural disappearance of the very small air bubbles which invaded from the nozzle, after the predetermined weight time amount progress by step S110, in step S111, the closure of the recording head is carried out and cleaning treatment ends it with capping equipment.

[0018]

[Problem(s) to be Solved by the Invention] by the way, the amount of ink nearby which the recording head with smaller nozzle density is called for, for this reason is breathed out at once in said ink jet type recording device which was carried out in order to obtain higher resolution -- it considers as few conditions.

[0019] For this reason, the technical technical problem that the frequency of poor printing (dot omission) according [ the bubble in a cleaning sequence which was described above generated in a cap especially in the step of this suction ] to a reverse sink and this increases in the nozzle of an arm head occurs.

[0020] Although weight (standby) time amount is made to establish in order to wait for natural disappearance of the very small air bubbles which generally invaded from the nozzle, as shown in the above mentioned control sequence as step S110 on the other hand It is necessary to set this standby time as about 30 seconds, for this reason it will need 1 thru/or the time amount for about 2 minutes for cleaning of an arm head, will keep a user waiting in the meantime, and brings a result which gives mental troublesomeness to a user.

[0021] This invention is made in view of such a situation, and aims at offering the ink jet type recording device which controls foaming of the ink by suction and enabled it to prevent generating of poor printing by controlling the suction speed of ink proper on the occasion of suction of the ink in head cleaning actuation.

[0022] Moreover, this invention is making the degree of said foaming control, and aims at offering the ink jet type recording device which can skip the step of minute amount suction, or the step of standby actuation.

[0023]

[Means for Solving the Problem] An ink jet type recording device concerning this invention made in order to attain the purpose While closing an ink jet type recording head which carries out the regurgitation of the ink drop corresponding to print data, and said recording head In a step which is the ink jet type recording device equipped with a capping means to attract ink from a recording head in response to negative pressure from a suction pump, and attracts ink from a recording head with said capping means A control unit to which suction speed of ink is changed possesses.

[0024] In this case, as one desirable gestalt, said control unit is constituted so that a change

property of changing suction speed of ink gradually may be generated.

[0025] Moreover, as other one desirable gestalt, said control unit is constituted so that a change property of changing suction speed of ink continuously may be generated.

[0026] As other one still more desirable gestalt, said control unit is constituted so that a change property of changing suction speed of ink gradually and continuously may be generated.

[0027] As other one gestalt desirable further again, said control unit is constituted so that a change property of decelerating suction speed of ink gradually may be generated, as it generates a sequence which carries out another \*\*\*\* activation of the step which attracts ink at multiple times and moves from an early ink suction step to an ink suction step of an anaphase from a recording head with a capping means.

[0028] And in a gestalt of typical operation, said control unit is constituted so that dividing of the signal acquired from a reference signal oscillator may be carried out based on different dividing data and a drive motor of said suction pump may be driven based on a signal by which dividing was carried out.

[0029] According to the ink jet type recording device made as mentioned above, in each step of this suction in a cleaning sequence of an arm head shown, for example in drawing 7, the minute amount suction 1, and the minute amount suction 2, control to which suction speed of ink is changed is performed.

[0030] Thereby, foaming of ink within a cap after suction of ink can be controlled, and poor printing generating by a bubble flowing backwards in a head nozzle is controlled effectively.

[0031]

[Embodiment of the Invention] Hereafter, the ink JITTO type recording device concerning this invention is explained based on the gestalt of operation shown in drawing.

[0032] Drawing 1 shows the whole ink jet type recording device configuration to which this invention was applied. In drawing 1, a sign 1 is carriage, and it is combined with a part of timing belt 2, and this carriage 1 is driven by both-way rotation of a motor 3, and it is constituted so that it may show around at the guide member 4 and may move in parallel with a platen 5. the recording head 7 which carries out the regurgitation of the black ink to a printing field side (left-hand side in drawing 1) in the record form 6 of carriage 1, and the field which counters -- moreover, the recording head 8 for color printing is carried in a non-printed field side, and each recording heads 7 and 8 are constituted so that an ink drop may be breathed out and printed from the black ink cartridge 9 and the color ink cartridge 10 to the record form 6 in response to supply of ink, respectively.

[0033] 11 arranged to the non-printed field is KYAPPINKU equipment, and is carried in the cap electrode holder with same cap member 12 which closes the recording head 7 for black ink and cap member 13 which closes the recording head 8 for color ink. And each is connected to the pump unit 15 which consists of two sets of the pumps 15A and 15B which can be driven independently through the tube so that it may mention later.

[0034] Moreover, the cap members 12 and 13 are equipped with the size which can close the nozzle effective area of recording heads 7 and 8 in one space, respectively, close a nozzle orifice at the time of un-printing, and at the time of regurgitation capacity recovery operation (at the time of cleaning actuation), in response to supply of negative pressure, they consist of pump units 15 so that recording heads 7 and 8 to ink can be made to discharge compulsorily.

[0035] And the cap members 12 and 13 are opened for free passage by atmospheric air through migration of carriage 1, and the atmospheric-air disconnection bulbs V1 and V2 by which closing motion is controlled by a driving means etc. again and which are mentioned later, in order to be discharged in a cap member and to discharge effectively the ink which piled up here. Moreover, near the capping equipment 11, the cleaning member 17 which consists of elastic plates, such as rubber, is arranged.

[0036] Drawing 2 shows the configuration of the ink cartridge with which the recording device shown in drawing 1 is loaded. In addition, the ink cartridge shown in drawing 2 shows the example of the color ink cartridge 10 with which the ink of each color of yellow, a Magenta, and cyanogen was filled up, and the size of the cross direction is shortened in the black ink cartridge 9 with which black ink was filled up, it is different in that ink \*\*\*\* is one, and other configurations are mostly carried out to the same configuration with the color ink cartridge 10 explained henceforth.

[0037] Fundamentally, the color ink cartridge 10 consists of wrap lids 41 in the main part 31 of a container in which injection molding was carried out to the core box by polymeric materials, such as polypropylene, polyethylene, and polystyrene, the form 35 with which ink consists of a porosity member by which impregnation is carried out, and the upper surface of the main part 31 of a container.

[0038] The main part 31 of a container is separated into the form room 36 in which form 35 is held, and the ink room 37 in which ink is held as it is from diaphragms 32, 33, and 34. Moreover, free passage opening prolonged to the ink feed hopper 38 is formed in the pars basilaris ossis occipitalis of each form room 36, and the filter 48 which consists of mesh material, a nonwoven fabric, etc. of stainless steel is formed in the upper part of free passage opening.

[0039] a part for opening of the ink feed hopper 38 -- the ink supply needle of a recording head, and liquid -- the packing member 45 which fits in densely is inserted, and the \*\*\*\*\* film 46 which can be damaged by insertion of the ink supply needle of a recording head is stuck at the tip of the ink feed hopper 38.

[0040] The winding slot 47 where the closure of the upper surface of the main part 31 of a container is carried out with the lid 41, and the atmospheric-air free passage opening 39 which is located in a lid 41 near the ink feed hopper 38 of each form room, the ink inlet 40, and an end are open for free passage to the atmospheric-air free passage opening 39, and the other end is prolonged in the other end of a lid 41 is formed.

[0041] Moreover, the \*\*\*\*\* film 49 is stuck on the surface of a lid 41 so that the atmospheric-air free passage openings 39, the ink inlets 40, and all the slots 47 may be covered, and especially band-like partial 49a of a wrap film has composition which can be opened in tip 47a of a slot.

[0042] By tearing off band-like partial 49a of a film just before use of an ink cartridge, atmospheric air flows from tip 47a of a slot, and it is constituted so that it may be possible to carry out atmospheric-air release of the atmospheric-air free passage opening of each form room at once.

[0043] Next, drawing 3 shows the configuration of the pump unit 15 possessing the cleaning member drive unit 50 by the decomposition perspective diagram.

[0044] The pump unit 15 possesses pump frame 15c by which Bodies 15a and 15b were formed in both that outside, respectively, and it obtains the driving force of the pump motor which the pump foil 15d and 15e mentions later as a driving source at these bodies 15a and 15b, respectively, and it is arranged so that normal rotation and an inversion may be attained.

[0045] It is constituted so that it may be made to each pump foil 15d and 15e whether it is made whether 15f of two bosses which an end turns in the direction of a center, and the other end turns in the direction of a periphery, and are extended is prepared, respectively, and roller 15g supported to revolve by 15f of these bosses according to the hand of cut of the pump foil 15d and 15e is biased in the direction of a center, or to incline in the direction of a periphery. And it is constituted so that the pump action which performs the operation which pressurizes tube 15h among Bodies 15a and 15b by roller 15g, and is drawn through, and the release operation which does not pressurize tube 15h may be made to perform.

[0046] In addition, it connects with ink suction opening (not shown) of the above mentioned capping equipment 11, respectively, and the said tube 15h [ each ] end is constituted so that the negative pressure according [ on a carrier beam case and ] a cleaning command to the drive of a pump unit 15 may be impressed to the building envelope surrounded by the cap members 12 and 13.

[0047] Moreover, cleaner cam 50b has fitted loosely into the pump foil 15d axis of rotation through clutch plate 50a, and the cleaning member drive unit 50 is constituted so that the pressure welding of the cleaner cam 50b may be carried out to clutch plate 50a by compression-spring 50c.

[0048] And it is attached so that slide lever 50e by which the cleaning member 17 was established can slide on the upper part horizontally to frame 50d, and said cleaner cam 50b is engaging with a part of this slide lever 50e.

[0049] Said cleaner cam 50b is dragged in this direction through clutch plate 50a by rotation of a pump foil 15d one direction, and it acts so that said slide lever 50e may be moved to one horizontal direction. Moreover, cleaner cam 50b is dragged in the other directions through clutch plate 50a by rotation of the pump foil 15d other directions, and it acts so that

said slide lever 50e may be moved to the horizontal direction of another side.

[0050] Therefore, by the normal rotation and the inversion drive of a pump motor which drive a pump unit 15, said cleaning member 17 attached in the upper part of slide lever 50e acts so that it can invade or evacuate to the wiping location on the moving trucking of recording heads 7 and 8, and in the invasion condition to the wiping location of the cleaning member 17, the nozzle side of recording heads 7 and 8 is wiped away.

[0051] Drawing 4 shows the control circuit of the recording device constituted as mentioned above. A sign 20 is a printing control means, it generates bit map data based on the print data from the host computer of a recording device, generates a driving signal by the head driving means 21 based on this data, and makes ink breathe out from recording heads 7 and 8 in drawing 4. The head driving means 21 is constituted so that the driving signal for the Flushing actuation may be outputted to recording heads 7 and 8 at everything but the driving signal based on print data.

[0052] A sign 22 is a cleaning control means, controls the pump driving means 25 based on power-up and suction reinforcement which is later mentioned again with the signal from the suction command detection means 23 and the suction timer 24, suction time amount, and a suction interval, and controls each suction pumps 15A and 15B.

[0053] When 26 is the Flushing control means, printing actuation carried out fixed time amount continuation and the Flushing command is outputted from the printing control means 20, And when the deadline signal from the FURASSHIGU hold timer 27 which the suction terminate signal from the cleaning control means 22 is outputted, and is mentioned later is outputting By the printing control means 20, about recording heads 7 and 8, it is made to usually move to a capping location, and they are the Flushing location, and prevention of blinding and the thing which makes the ink drop of a predetermined number breathe out from each recording head 7 or all the nozzle orifices of 8 in order to cancel blinding.

[0054] the phase in which the cleaning production process ended said FURASSHIGU hold timer 27 -- a time check -- actuation is started, and it is the phase which clocked the time amount which will correspond by the time the air bubbles produced near the nozzle orifice of recording heads 7 and 8 at the cleaning production process carry out natural disappearance, and it is constituted so that the deadline of may be passed.

[0055] In addition, the sign 29 in drawing 4 shows the cleaning command switch formed in the control panel of the case which is not illustrated.

[0056] Next, drawing 5 shows the more detailed configuration of the cleaning control means 22 shown in drawing 4. 22a in drawing 5 is the reference signal generator which consisted of crystal etc., and the reference signal supplied from this reference signal generator 22a is impressed to one input edge of phase comparator 22b.

[0057] The output of phase comparator 22b is supplied to low pass filter 22c, and the output by low pass filter 22c is amplified by 22d of DC amplifier, and it is constituted so that it may

be impressed as an oscillation control signal to voltage controlled oscillator 22e. Dividing of the oscillation output of voltage controlled oscillator 22e is carried out by prescaler 22f, and it is supplied to programmable divider 22g.

[0058] It is constituted by programmable divider 22g so that dividing data may be supplied from 22h of central processing units, dividing of the output from prescaler 22f is carried out by this, and the dividing output is constituted so that the input edge of another side of said phase comparator 22b may be supplied. That is, the above circuit constitutes PLL.

[0059] The status signal etc. is supplied to 22h of said central processing units from host KOMPYUTA of the cleaning command signal from the suction command detection means 23, or a recording device, and it is made as [ access / the table stored in ROM22i based on these signals ].

[0060] The dividing data corresponding to this suction (step S102) in the control sequence shown in drawing 7, the minute amount suction 1 (step S104), the minute amount suction 2 (step S107), etc. is stored in ROM22i for example, in table format, and it is constituted so that the data corresponding to these can be read with said status signal.

[0061] For example, when this suction is started, 22h of central processing units reads the dividing data used in this suction from ROM22i, and they supply this to programmable divider 22g.

[0062] While carrying out dividing with the rate of dividing which the rate of dividing was set [ rate ] up programmable divider 22g based on said dividing data, and had the signal supplied from prescaler 22f set up, the dividing output is supplied to phase comparator 22b. Phase comparator 22b compares the phase of the reference signal supplied from reference signal generator 22a, and the dividing output from programmable divider 22g, and supplies the error signal according to the phase contrast to low pass filter 22c. By 22d of amplifier, impedance conversion of the direct-current error signal obtained by low pass filter 22c is carried out, and it turns into an oscillation control signal of voltage controlled oscillator 22e.

[0063] Therefore, the oscillation output based on an error signal is obtained from voltage controlled oscillator 22e, and after dividing of this is carried out by prescaler 22f, it constitutes the feedback loop which returns to programmable divider 22g.

[0064] That is, PLL can lock based on the dividing data given to programmable divider 22g from 22h of central processing units, and the AC signal based on said dividing data can be acquired from prescaler 22f as a result.

[0065] Waveform shaping circuit 22j is connected to prescaler 22f, and the pulse signal obtained by this waveform shaping circuit 22j is supplied to the pump drive motor 60 through pulse signal output circuit 22k.

[0066] Frequency of the pulse signal from which three kinds are prepared as fixed data, consequently the dividing data given to programmable divider 22g from 22h of said central processing units is obtained by waveform shaping circuit 22j is set to 4100Hz, 2400Hz, and 1200Hz.

[0067] Moreover, there are some which gave the sweep property as dividing data given to programmable divider 22g from 22h of central processing units, and the sweep frequency range of the pulse signal obtained by waveform shaping circuit 22j as a result can be set to 0 thru/or 4100Hz by giving the dividing data of this sweep property to programmable divider 22g.

[0068] On the other hand, from ROM22i, 22h of central processing units reads level control (turning on and off) data, and they supply a level control signal to pulse signal output circuit 22k based on the data. Therefore, pulse signal output circuit 22k turns on or operates [ off ] the pulse signal obtained by waveform shaping circuit 22j with a level control signal.

[0069] Thus, the pulse signal obtained from pulse signal output circuit 22k is supplied to a pump motor 60, and said pump motor 60 constituted by the pulse motor carries out a rotation drive according to the number of steps of the pulse signal supplied.

[0070] Consequently, as for said suction pumps 15A and 15B, adjustable [ of the suction speed ] is carried out according to the number of steps of a pulse.

[0071] Drawing 6 shows the control mode of suction speed with the pump obtained by the cleaning control means 22 shown in drawing 5.

[0072] That is, (a) shows the mode of gradual moderation suction, in the step of this suction, drives a pump motor 60 by the 4100Hz pulse signal, and shows the condition of driving a pump motor 60 by the 1200Hz pulse signal, respectively, in the step of the minute amount suction 2 by the 2400Hz pulse signal in the step of the minute amount suction 1 again.

[0073] According to the suitable example of this invention, it is desirable to attract the 1 time thru/or about 2 times ink of head passage volume by the rate of flow (for a pump motor drive to be equivalent to 2400Hz or more) of at least 0.2 or more cc/sec, in order to discharge residual air bubbles, and it is desirable to, attract 1 or less time [ of head passage volume ] ink by the rate of flow of 0.2 or less cc/sec on the other hand, in order to suppress foaming at the time of ink suction and a back flow inside [ of a bubble ] a head nozzle

[0074] That is, since it draws in at high speed and in the beginning suppresses foaming of ink, and a back flow for residual air-bubbles discharge, the mode of (a) draws in to \*\*\*\* at a low speed. If such a driving means is chosen, since the damage in this suction will be eased by \*\*\*\*, even if it does not set the standby (weight) actuation shown at step S110 as drawing 7, sufficient cleaning action can be obtained.

[0075] Moreover, it sets at the time of initial restoration which replaces the inside of head passage from the state of the sky or a conservation liquid restoration condition to ink etc. As shown in (b), it sets to the step of this suction and the minute amount suction 1. by driving a pump motor by the 4100Hz pulse signal, making the cellular discharge effect more conspicuous and driving a pump motor by the pulse signal of 1200Hz only in the step of the minute amount suction 2 of finishing Discharge of residual air bubbles, foaming of ink, and reduction of a back flow can be realized, and sufficient cleaning action can be obtained.

[0076] Moreover, (c) shows the mode of continuous moderation suction and lowers suction

speed continuously during implementation of this suction. That is, in the step of this suction, by the 4100Hz pulse signal, a pump motor 60 is driven and a pump motor 60 is driven with the sweep property of resulting [ from 4100Hz ] a driving pulse in 0 after that. In order that this example may also draw in at high speed and may suppress foaming of ink, and a back flow in the beginning for residual air-bubbles discharge, it draws in to \*\*\*\* at a low speed. If such a driving means is chosen, since there are few damages in this suction, even if it does not set up the minute amount suction 1 and 2 and standby actuation, sufficient cleaning action can be obtained.

[0077] Moreover, (d) performs gradual moderation suction, after continuous acceleration drawing in by this suction, ends this suction in the mode in which suction speed is continuously accelerated to 0-4100Hz in the step of this suction, and shows the condition of driving a pump motor 60 by the 1200Hz pulse signal, respectively, in the step of the minute amount suction 2 by the 2400Hz pulse signal in the step of the minute amount suction 1 again.

[0078] That is, this can suppress foaming of ink, and a back flow, in order to be able to stop foaming of ink and to draw in to \*\*\*\* by accelerating suction speed continuously in this suction at a low speed. In this case, since the damage in this suction is eased by \*\*\*\*, even if it does not set up standby actuation, sufficient cleaning action can be obtained.

[0079] Furthermore, after (e) performs continuous moderation suction after continuous acceleration drawing in by this suction, and it accelerates suction speed continuously to 0-4100Hz in the step of this suction, it performs the drive by 4100Hz of predetermined time amount, and decelerates suction speed continuously to after that 4100Hz-0.

[0080] That is, in order to be able to stop foaming of ink and to draw in to \*\*\*\* at a low speed because this also accelerates suction speed continuously in this suction similarly, foaming of ink and a back flow can be suppressed. In this case, since there are few damages in this suction, even if it does not set up the minute amount suction 1 and 2 and standby actuation, sufficient cleaning action can be obtained.

[0081] In addition, the control mode of the suction speed shown in drawing 6 is typical, and can obtain the head cleaning action which can prevent the back flow of foaming of ink, and the bubble into a head nozzle by combining these control modes.

[0082]

[Effect of the Invention] Since the control unit to which the suction speed of ink is changed a clear passage in the step which attracts ink from a recording head with a capping means in the ink jet type recording device concerning this invention by the above explanation was provided, foaming of the ink within the cap by suction of a pump can be made to control by controlling the suction speed of ink proper. Therefore, the back flow of the bubble into a head nozzle can be pressed down, and it becomes possible to prevent generating of poor printing.

[0083] Moreover, in connection with the ability to control foaming of the ink within a cap, it

also becomes possible to skip suitably the step of minute amount suction in a head cleaning sequence or the step of standby actuation. In this case, it can become possible to shorten the time amount which head cleaning takes, and commodity value can be raised.

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## DESCRIPTION OF DRAWINGS

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### [Brief Description of the Drawings]

[Drawing 1] It is the perspective diagram having shown the configuration of the ink jet type recording device with which this invention is applied.

[Drawing 2] It is the decomposition perspective diagram having shown the configuration of the ink cartridge with which the recording device shown in drawing 1 is loaded.

[Drawing 3] It is the decomposition perspective diagram having shown the configuration of the suction pump unit with which the recording device shown in drawing 1 was equipped.

[Drawing 4] It is the block diagram having shown the control circuit of the recording device shown in drawing 1.

[Drawing 5] It is the block diagram having shown the more detailed configuration of the cleaning control means in drawing 4.

[Drawing 6] It is property drawing having shown the control mode of the suction speed made by the cleaning control means shown in drawing 5.

[Drawing 7] It is the flow chart which showed the operating sequence of head cleaning.

### [Description of Notations]

1 Carriage

7 Eight Recording head

9 Ten Ink cartridge

12 13 Cap member

15 Pump Unit

15A, 15B Suction pump

17 Cleaning Member

20 Printing Control Means

21 Head Driving Means

22 Cleaning Control Means

22a Reference signal generator

22b Phase comparator

22e Voltage controlled oscillator

22g Programmable divider

22h Central processing unit

22k Pulse signal output circuit

25 Pump Driving Means

31 Main Part of Container

35 Form  
38 Ink Feed Hopper  
39 Atmospheric-Air Free Passage Opening  
41 Lid  
45 Packing Member  
46 49 \*\*\*\*\* film  
47 Slot  
50 Cleaning Member Drive Unit  
60 Pump Motor  
V1, V2 Atmospheric-air disconnection bulb